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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Optimal estimation of tropospheric H_2O and δD with IASI/METOP" *by* M. Schneider and F. Hase

Anonymous Referee #2

Received and published: 9 August 2011

First of all my sincere apologies for the late review, I wasn't following the *practice what you preach* principle.

General comments

The paper by Schneider and Hase elaborates a new retrieval method of HDO/H2O abundances using the IASI instrument and they perform a rigorous validation exercise using ground-based FTS data as wel as radiosonde measurements. Agreeing with the 1st reviewer, I don't see any real need for changes in the analysis and my comments are mostly technical and should be straightforward to implement.

Specific comments

Page 16108, line 23: Better to add specific references here (not just list them at the

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end of the introduction). There are a few papers by Risi et al as well as a recent JGR paper (in press) by Kei Yoshimura, all of which should be cited as they directly concern interpretation of satellite data.

Page 16110, line 2: Add TES and IASI resolutions here, otherwise it is unclear by how much they are different. You can oppose the two instruments: TES: good spectral resolution but bad coverage when compared to IASI. Further, it sounds awkward here to say : "it is very likely..." . The whole paper is about showing that you can, so just state that.

Line 21: Explain acronyms the first time they appear. Is Schneider and Hase 2009a an RTM reference?

Page 16112, line 19: Is this a typical IASI spectrum in Figure 1 (or one with high SNR, low SNR?)? It would be good to add the SNR estimate , residual wrt to SNR (as stated by reviewer 1) and ideally to also plot the HDO and H2O Jacobians in the figure as sub-panels so that one can see the regions of sensitivity.

Page 16117, Spectroscopic uncertainties: Do you account for self-broadening (as H2O-H2O broadening is almost 5 times higher than H2O-air broadening)? Errors (or neglect of) in self-broadening may be quite crucial as this bias would depend on the H2O VMR in the end and propagate into the interpretation of results (e.g. when looking at the Rayleigh-curve relationship).

Line 25: Dot after importance

Page 16121, line 24: Nice is a rather qualitative statement. Do you mean "best" or do you mean nice because this is a region of special interest (or a mix of the two)?

Page 16122, convolution of EUM data: Convolving EUM profiles with the PROFFIT AKs only yields same characteristics as PROFFIT if the EUM AKs are very narrow. Otherwise, it is a double convolution. In principle, you would need to find the convolution function with which you get PROFFIT AKs when convolving EUM AKs. Did you

ACPD

11, C7547–C7549, 2011

test for this? It may be only a very small effect.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 16107, 2011.

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11, C7547–C7549, 2011

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